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ABSTRACT

Recent developments in electronics have had a profound effect on information and communication systems. This report identifies the instructional technologies currently available, examines their use in California community colleges, and explores implications for the future. Following introductory remarks on the technological revolution and its impact on education, technologies currently used by community colleges are examined, including open circuit and cable television, instructional television fixed services, microwave transmission, cassette recordings, video discs, radio, computers, and satellites. After current activities using instructional technology are noted, two programs of the Public Broadcasting Commission are described: the Public Telecommunications Project, which reviews the use of telecommunications among all public agencies, and the "Consumer and Cable Project" which addresses consumer rights related to cable systems. Next, the educational programming activities of business and industry are discussed, and the implications of new cable systems for education are considered. A discussion of the possible impact of technology on colleges in areas such as alternative delivery systems, cost effectiveness, and improved communication and access is followed by sections on budget development and options for integrating communications systems into the curriculum. Final remarks focus on planning and administrative priorities. (LAL)

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Management Report

1983 - 4/1

TECHNOLOGY IS READY--BUT ARE WE?

MANAGEMENT'S CHALLENGE

Robert Wyman

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Robert Wyman is Director of Special Projects for the Los Rios Community College District.

He is currently also the President of the Sacramento County Corporation for Educational Telecommunications; President of the Television Consortium of Valley Colleges; and he serves as the Community College Representative to the California Commission on Public Broadcasting. His administrative assignments have taken him to all three Los Rios campuses as Community Services Officer, Associate Dean of Instruction, Dean of Community Based Education, and Dean of Instruction.

Mr. Wyman's statewide activities include membership on the Assembly Committee on Commerce Task Force on Minorities in Cable TV; The State Telecommunications Project; and, the Consumer and Cable--all groups making reports on Telecommunications to the state legislature concerning the role of Cable Television in California. As a result of his expertise and experience, he is recognized throughout the State as a leader in this field.

FOREWORD

Recent developments in electronics--most significantly the microchip and the transistor--have had a profound effect on information and communication systems. One result of these developments is the emergence of a new instructional technology with the potential to reshape the teaching-learning process at all levels of education.

In this Management Report, Robert Wyman, Director of Special Projects for the Los Rios Community College District, identifies available technologies, reports on their current use in California Community Colleges, and explores the implications for the future. His appraisal concludes with a call for administrators to become a creative force in the new technology.

Raymond D. Liedlich
Columbia College

TECHNOLOGY IS READY--BUT ARE WE?

MANAGEMENT'S CHALLENGE

Last October, Sven Groennings, Director of the Fund for the Improvement of Postsecondary Education, wrote an innovation abstract for the University of Texas in which he quoted Edmund Burke, "You can never plan the future by the past."(1) Groennings, however, suggests that one might predict the future by extrapolating current trends. Those trends he lists as:

.The growing importance of science and technology
.The internationalization of American Life (which he links to the phenomenon of technological change)
.The change in the occupational structure of American society and,
.Demographic change.

His supposition as a result of these observations is that when education lags, the nation's ability to adapt, to progress, and to compete is impeded. He finishes his observation by stating that "the greater the rate of change in technology and in the world around us, the more and the faster education needs to adapt."

I would suggest that the world is indeed changing dramatically and that even though education is taking strides toward change, we need a couple of "leaps" amongst those strides just to let folks know we are still alive and well.

Everyone is aware that we are in the midst of a technological revolution which will probably surpass the impact of the industrial revolution. Alvin Toffler said it better in his book, The Third Wave: "The dawn of this new civiliation is the single most explosive fact of our lifetime. It is the central event--the key to under-

standing the years immediately ahead. It is an event as profound as the First Wave of change unleashed ten thousand years ago by the invention of agriculture or the earthshaking Second Wave of change touched off by the industrial revolution. We are the children of the next transformation, the Third Wave."(2)

Central to that transformation has been the advent of the microchip and the transistor which have changed our lives and most certainly will change what happens in education in the next decade.

STATE OF THE ART

The use of technology has grown so rapidly that most administrators don't realize the breadth of activity already in place in education. I think it is important to identify what technology is now available to us, who is currently using these mediums--and what is the current activity. Finally, what are the implications of current and future mediums available to education through technological application and how do we plan for tneir use?

Let's look briefly at the range of technology used by community colleges today:

TELEVISION We all know what television is. The variations are interesting, however. There is open circuit TV which we receive at home via an antenna on our roof or in the attic.

ITFS - Instructional Television Fixed Service is similar to open circuit but requires a special antenna.

Cable - is multi-channel television transmitted through a coaxial cable--TV transmitted through a "hard wire" rather than through the air.

Microwave - is point-to-point transmission through the air, and can handle not only video, but audio and digital communications.

Cassette - TV which is recorded on tape and is available in various formats.

Video disc - television recorded not on tape but on a disc and replayed with the use of laser technology.

RADIO Not only is it available in AM and FM as we regularly hear it, but additional channels are now available because of band width in cable systems and regular TV signals.

COMPUTERS in varying sizes and capacity are becoming available faster than we can cope with them. Certainly the use of computer games by youngsters and adults today speaks to their potential appeal and use. Main frame and micro-computers can interface with all of the systems mentioned so far. Their potential for use in virtually every segment of our society is limited only by the imagination and, of course--money! Voice-activated computers and graphics activities such as Cad-Cam (Computer Assisted Designed-Computer Assisted Manufacturing) make it easy to predict that computer literacy will be a part of the core of general education packages at virtually every level of education.

SATELLITES are familiar to us as governmental probes into space. The reality is that the "satcoms" of the world are growing in use and number. Communication satellites have already become an integral part of the world's communication system. No longer are satellites available just for corporate empires and governments, but for schools, colleges and even individuals.

In addition to the list of technology already mentioned, variations on these mediums such as teletext, a slow-scan TV and teleconferencing are also currently being used by colleges.

CURRENT ACTIVITY

There is a lot of technology out there, but who is in fact really using it?

A chemistry instructor from Riverside City College, John Georgakakos, conducted a statewide survey on computer assisted instruction last October. Of 85 community colleges responding, 72 are actively using the computer either as a classroom resource or to provide individualized instruction. Ten others will start this year. It is interesting to note that while television has been at the focal point of distance instruction, the use of the computer has by far outstripped the use of television in instruction.

California State University at Sacramento has joined with Control Data and is currently the western regional contact with schools and businesses to supply courseware and the Plato system.

In another activity, the state universities have designed and started to build a microwave system to interlink their 19 campuses.

The University of California has designed a similar network for their 9 campuses.

The University of Pacific (McGeorge Law School) in Sacramento currently hires a law professor from NYU. He teaches live--and interactive from New York via satellite each week.

Stanford University has 80 locations in the Bay Area which receive graduate engineering classes via live TV instruction with 2-way audio.

Chico State University uses the same methodology as Stanford extending their campus to a variety of locations reaching as far as Sacramento.

San Diego County schools and community colleges are also actively using ITFS and microwave.

The Catholic Dioceses in the Bay Area are teaching and resource sharing by transmitting ITFS to 160 locations.

Cable systems throughout the state are being used by schools, colleges and universities for a variety of purposes.

Modesto Junior College has been receiving satellite programming for two years which, in turn, is programmed into a cable system and throughout the East and West campuses. Modesto has also decided to "hard wire" these campuses and is currently getting permits to lay their own co-axial cable between their two Modesto facilities. The resulting system will ultimately provide their own telephone, digital and video services to staff. In addition they will be linking all systems to Columbia College 57 miles away.

"As with other uses of cable in California, educational uses range from highly sophisticated state-of-the-art applications to no uses at all. A survey done for the League of California Cities and the California Public Broadcasting Commission showed that 56% of cities surveyed have some educational access available, although only 47% of the cities require it in their franchise agreements. Of the 56% with educational access: 70% carry 0-9 hours of programming per week, 7% carry 10-19 hours per week, 14% have 20-50 hours of programming per week, and 9% carry 50+ hours per week."(4)

PUBLIC BROADCASTING COMMISSION ACTIVITY

The Public Broadcasting Commission as well as a variety of

public and private entities are starting to look at the explosion of activity and discuss the implications on policy and legislation as they relate to an "information society". The Commission's role in statewide communications is to allocate federal dollars designated for public broadcasting. They also have a role in the cable deregulation bill, SB 699, in that they report to the legislature regularly on the impact of that bill on the cable industry. The Commission has an instructional broadcast advisory committee which represents all segments and which develops recommendations for instructional broadcasting that are in turn presented to the Commission.

The Commission currently has two projects underway. Each project in its own way deals with the emerging need to institutionalize new technologies and to insure public access to emerging resources.

PUBLIC TELECOMMUNICATIONS PROJECT

The Public Telecommunications Project is designed to review the state-of-the-art use among all public agencies including schools. The review included an inventory of facilities, equipment and the related costs of telecommunications. An initial study shows, for example, that one billion dollars a year is spent by the public sector in California for telephone service alone. The second phase of the project was to study the feasibility of interconnecting existing systems. Interconnecting communities statewide poses some interesting and exciting questions in relation to sharing, statewide, various resources now available on a limited basis. Project staff will recommend in July a statewide telecommunications system that

will be designed to handle public sector needs at substantial savings to everyone involved.

"This system actually would be a complex of systems which would respond to the individual requirements of institutions and locations. The idea is not to impose The Great Monolithic Network, but to build outward from local requirements, linking system elements in a way that will provide maximum economy while protecting the principle that the network must perform as if it were designed to meet the needs of each user.

Technically these individual systems would meet at about 15 hubs throughout the state, and the hubs would be interconnected via the "freeways" of the system. Phone, data, and video service all would be available as needed."(5)

THE CONSUMER AND CABLE PROJECT

The second project is called the "Consumer and Cable." It addresses consumer rights as they relate to the use of cable systems. There is a growing concern in the state that regulation and policy might have to be legislated to protect public access to cable. Second and third generation cable systems being refranchised with 100-plus channel systems promise potential options for education.

Because of the interest in refranchising, districts throughout the state are discussing the formation of consortia among community colleges to protect access to systems that are being refranchised.

Gwen Moore and others like Hart, Robinson and Montoya in the Senate and Assembly are actively developing legislation on telecommunications that could ultimately have impact on our use of available technology.

BUSINESS COMMUNITY ACTIVITY

If there has been an emphasis on activity in the community colleges this year other than budget, it is the need to interface with the private sector more effectively and to develop a more meaningful working relationship. JTPA and other activities are moving us toward being more responsive, flexible and innovative, all of which have application when looking at new technologies. Another aspect of our relationship with business and industry is their activity in becoming providers of educational programming.

In spring of 1979, Harold Hodgkinson, President of the National Training Laboratories, wrote predicting what was in store for colleges in 1985.

> In part he said, "More institutions of higher education, even large state universities, will chafe under the restraints imposed by state formula funding patterns which, for example, will not adequately provide the administrative overhead generated by the part-time student. Colleges--especially liberal arts institutions--will have learned new marketing and recruiting skills to accommodate demographic shifts. Industries will have moved full tilt into education, choosing to train and certify their own employees, over 400 choosing for all practical purposes to form their own universities.
>
> "Perhaps the central theme for success in higher education during the next decade will be accountability and accessibility.

"Education will take place in airports, hospital waiting rooms, factories, in private residences--in any number of places where students can literally complete educational programs as long as there is a telephone or an electrical outlet."(6)

Business and industry are looking very seriously at television, the computer, and other technologies as a profitable way to offer educational programming on site. There is little doubt such activity could impact what has been recognized as a territorial prerogative of the community college.

Many of these organizations are regularly accredited or are sanctioned by professional organizations. They are competitors of the community colleges in my view and because they can be cost effective, goal oriented, and offer flexible programming, we need to view them as being seen by the community as a viable alternative to the community college.

Instructional administrators are facing a new decade in which their programs will be put to the test by communities looking for programs and classes that are intensive, flexible and cost effective. Partnerships in the contract class arena will have an important role not only because they present relief from state funding constraints, but because they are a natural partner to an expanding family of on-site delivery systems that will make them attractive to business and industry.

National corporations such as McGraw-Hill and J.C. Penney are becoming very active as producers of courseware that can be used by businesses and individuals to gain skills and knowledge normally

found today in the community college curriculum.

Sears Roebuck has applied, I understand, for a low-power television channel in every metropolitan area in the country. Part of their programming will be educational and in competition with our curriculum offerings.

The Appalachian satellite makes available to those who wish to access for a fee, about forty hours a week currently--programs that are strictly instructional and at the adult level.

THE WIRED SOCIETY

What is the so-called "wired society" and why should we be concerned?

New cable systems being bid transcend just the entertainment package. Indeed, most industry spokespersons acknowledge that the entertainment package is just the tip of the iceberg when discussing services now possible.

New systems will undoubtedly allow subscribers not only to view entertainment; they will have the option of home banking and shopping; they will be able to use their TRS-80's or Apples to access data bases available on a per-hour use rate; they will be able to interact with local government and education; they will be able to hook up their homes to security and fire alarm systems at far less per month than presently possible.

That's the subscriber side of the system! On the institutional side, all schools, libraries and governmental facilities can be linked by a cable not necessarily available on the subscriber network called an institutional loop or network.

Sixty percent of the cable systems in the state will be going through the refranchising process by 1987. Is your institution and district negotiating options open to them for meaningful access to the cable in your community? The probability is that systems statewide will be increasing their channel capacity during the refranchising period. By sharing resources and channel allocations, schools and colleges can make better use of the cable and extend or broaden services into the community.

It is important to recognize that almost all of our communities have already become "wired". We aren't really speaking so much about what will be, but rather how we can use to better advantage those systems being built and those that already are functioning. Between the telephone companies, various existing cable companies and what we can install ourselves, I believe we need to start serious planning on how technology should be used in our institutions. Not to recognize the changes currently taking place in how we communicate and share information will continue to make us reactive, rather than proactive. Managers in educational institutions have a responsibility to plan for the future. It's time to implement master planning that incorporates the utilization of new technologies in our daily operation.

IMPACT ON COLLEGES

I would suggest that, when used appropriately in our colleges, technology can:

.Supply alternate delivery systems;

.Be more cost effective in certain applications;

.Be more flexible than traditional methodology;

.Create a better communication system inter- and intra-campus;

.And provide quicker access to programs and resources.

I recognize the concern some faculty have when so-called advocates of television and other media bang the drum extolling its use. I agree that there can be cause for alarm if there is not a conscious effort to build into our system of education an appropriate acknowledgment of what new technologies can be or not be when applied as learning systems.

The activity of other agencies and the private sector is an area of concern. The potential for earning large numbers of dollars is always a great motivator. The community college is in a vulnerable position given the status of the economy and public state of mind.

The successful community college of the next decade will be the college that planned carefully--with the staff totally involved in that planning--to use computers, television and all of the other communication devices and who ended up serving the community needs--quickly, flexibly, and certainly better than some outfit looking to make a quick profit.

OPTIONS

In order to be competitive in the 80's--and I think we shall have to be just that--we will have to rekindle an interest in innovation. Remembering that creativity has nothing to do with more money. The money helps in many cases, of course. Businesses and other public agencies will support an effort on our part to change some, not all, of our approaches to accommodate rapid change of

skill needs in fields of work, an inability to travel to get to campuses, and an effort on the party of community colleges to utilize those skills we teach students in our own programs and services. Finally, the accommodation might very well be in an area of financial assistance.

Since Prop 13 many public institutions have fallen back from an aggressive stance to a passive one, citing a lack of funds as our main problem. Certainly it is. I'm not certain, however, that we have looked at all of our options to combat the problem.

The fundamental question of how an A.A. is earned and what it represents will have to be addressed by the colleges when developing services and programs for the next decade.

Contract classes and programs seem to be an emerging approach with promise of more income and less need to offer multiple sections on campus because firms are paying for employees' classes at work on special locations rather than sending them to campus and enrolling on their own as in the past. Variations of community services and cultural programming still can provide programs at cost-covering levels.

At American River College, for example, we have been successfully offering advanced recertification of welding. Formerly a credit class, it is now offered as a community service course. The $450 fee per eight-week class has not diminished the requests, and in fact we still have a waiting list. The resulting sections left by the switch allowed more regular welding classes to non-returning students. I think the combination of contract services, community services and instructional technology poses some exciting possibilities.

I would urge the faculty to take a leadership role in identifying appropriate uses for the new technologies we already see being utilized on campuses. Like the administration, faculty has a responsibility for planning and implementing new strategies. The age old saying "Those who can't, teach" is slowing giving way to "Those who can, teach." But it won't really happen, in my opinion, until the faculty, along with administration, address the integration of communications systems into mainstream curriculum and budget development both short term and long range.

PRIORITIES

I would suggest that priorities for planning include, but not be limited to:

.The impact on existing programs and services;

.Staffing implications and needs;

.Retraining considerations;

.Cost effectiveness; and

.New services not now offered.

The community colleges in California have already begun to address the "Third Wave." Over eighty of our colleges offer instruction via television each semester. Several of our schools offer services through radio such as reading services for the non-sighted.

Computers are virtually everywhere and constitute the real impact of technology. Citing the Riverside study subject matter areas using CAI demonstrates a wide range of use. For example--of the 72 colleges responding who use the computer for instruction, these are some subjects and their frequency of use:

Biology	43%
Business	55%
Chemistry	61%
English	34.7%
Mathematics	88.3%
Physics	59.7%
Psychology	25%
Vocational	44%

It would appear that the expertise is available. The need is to get the activity out into the light, support master planning and prioritization of how these information distribution systems can best be used.

ADMINISTRATION'S RESPONSIBILITY

In November 1981 the California Postsecondary Education Commission published a report from its technical advisory committee on telecommunications called "Linking Californians for Learning".(7) In it the committee identifies five major areas of knowledge as major social needs:

- .Basic adult competencies or survival skills
- .Understanding of government, public issues, and services
- .Employment information and occupational skills
- .Social responsibilities and individual development
- .Continuing professional development

Chapter Two of the report proceeds to then identify how these needs might be met through the use of instructional technology (at least partially).

"Since more and more information processing is being transferred from human brains into information technology, the present role of the educational system will be questioned. New goals must be found to justify its funding." (8)

The point to be made is that although there is sporadic activity that can be identified now one year later, the fact is, coordinated planning to utilize or prioritize options still is in the talking stage within most districts.

We are in danger of having myopia when reacting to daily crisis, not always remembering that planning for the long term can quite often solve or alleviate the short term dilemma. Until community college managers are conversant with the systems available and the options they present, adequate planning for the next 5, 10 or 15 years cannot happen. We have all been told that the successful manager listens, shares, communicates and plans. Certainly having some vision for the future must also be a requisite.

The community college and its staff will need to take a competitive stance during the next decade. We know that to be proactive means that one needs not only to have vision but must be willing to take certain risks as well. Compared to the information technology industry and its current activity, the educational system is slow, lacks flexibility and certainly lacks a solid financial base. With education as dependent on "information" as it is, it is amazing that we are not in the forefront in using the information distirbution systems currently available.

Some of our institutions have started integrating modern systems into communication needs and activities. The next step will be to incorporate, when appropriate, those mediums into the "mainstream" of activity by prioritizing them within the matrix of other options we choose every day and year.

Because of today's available technology, community college administrators have a responsibility to act as a "creative" force with staff identifying the technology "menu" that might make some of our needs and requirements more flexible, accessible, possibly cost effective, and certainly more timely. Our profession needs to adjust to and use the tools of the "information society." It may just be that we are still gulping water from having been hit with the "Third Wave" and haven't noticed that ripple out there forming the Fourth.

(1) INNOVATION ABSTRACTS, Oct. 1982, "Redefining the Direction of the Enterprise", by Sven Groennings, Director F.I.P.S.E., Vol. IV, 100.27, Univ. of Texas at Austin

(2) "The Third Wave", Alvin Toeffler, William Morrow and Co. Publishers, 1980

(3) "Survey on Computer Assisted Instruction in the California Community College", John H. Georgakakos, Riverside Community College, October 1982

(4) "Short and Long Term Strategies for Encouraging Municipal and Educational Use of Cable", Eileen Sheehan, May 1983, Graduate School of Public Policy, UC Berkeley; Study conducted as part of Masters Degree fulfillment

(5) Public Telecommunications Project, John Witherspoon, Project Director, California Public Broadcasting Commission, 1983

(6) INNOVATION ABSTRACTS, Sept. 1979, "A Futuristic Look: Education in 1983", by Harold L. Hodgkinson, President, National Training Laboratories, Vol. 6, No. 2., Univ. of Texas at Austin

(7) "Linking Californians for Learning", Dale Heckman, Editor, California Postsecondary Education Commission, November 1981

(8) T.H.E. JOURNAL, January 1982, "Challenge of Information Technology to Education: The New Educational Crisis", by Klaus Haefner, University of Bremen, Bremen, Germany

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